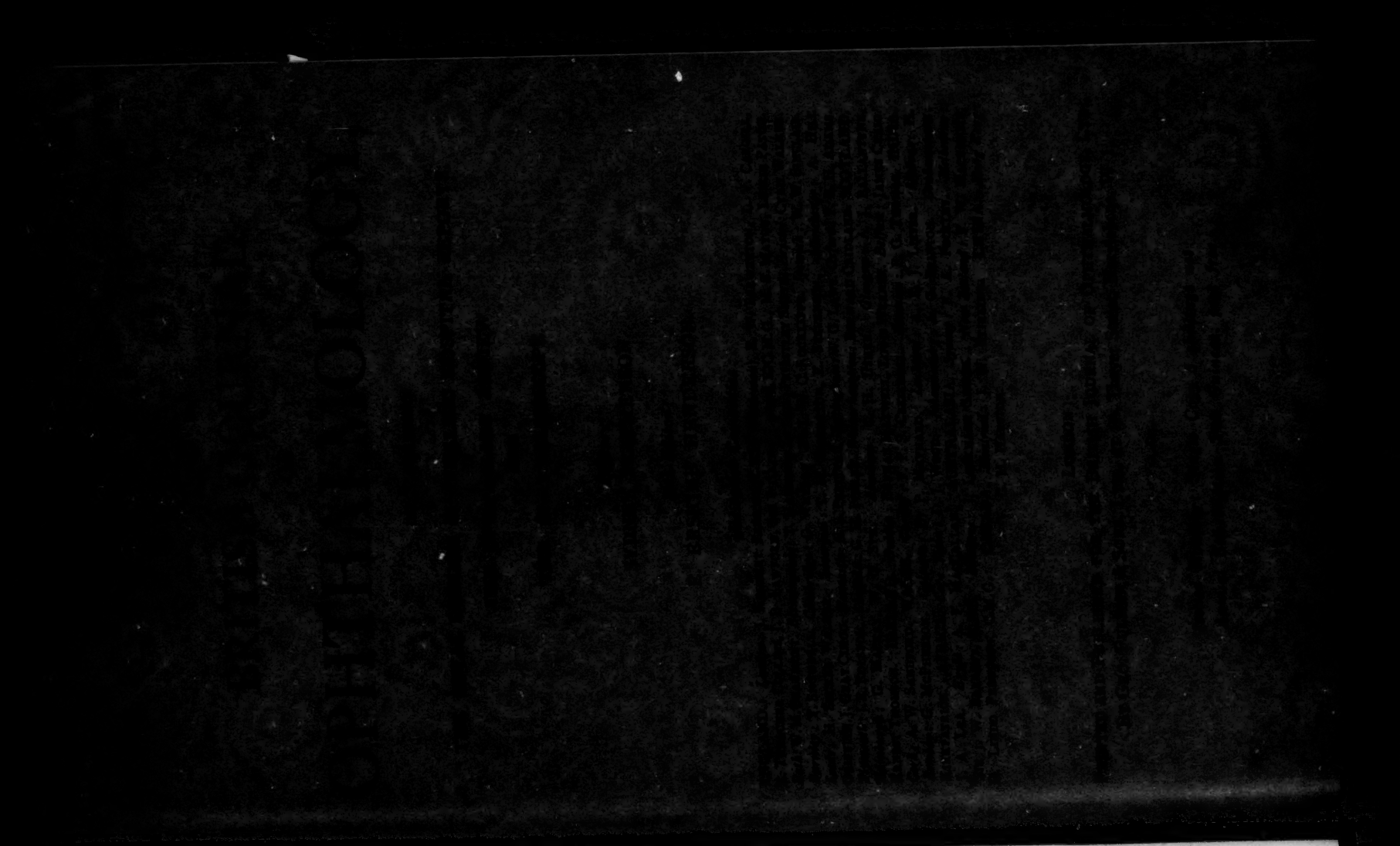

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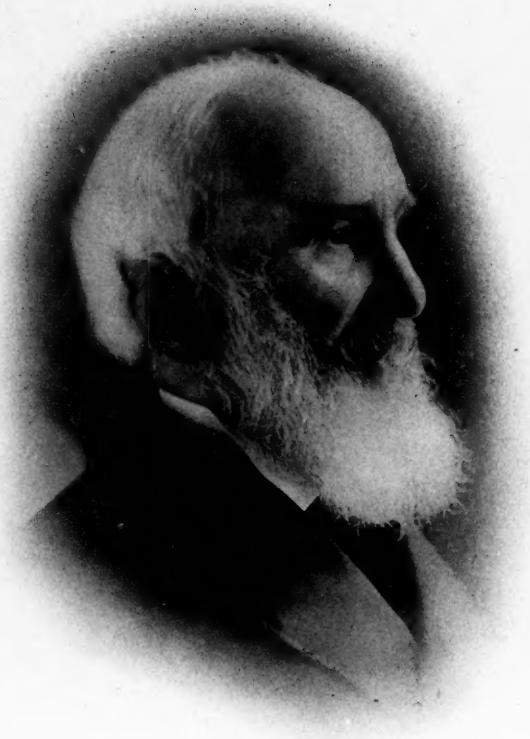

RICHARD MIDDLEMORE

(1804-1891)

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BRITISH MASTERS OF OPHTHALMOLOGY SERIES

II.—RICHARD MIDDLEMORE, (1804-1891).

BY

D. C. LLOYD-OWEN, M.D., F.R.C.S.I.,

BIRMINGHAM.

RICHARD MIDDLEMORE, who was for some thirty years the leading ophthalmologist in the Western Midlands, was the second son of Richard Middlemore, of "The Davids," a small estate in the parish of Northfield, near Birmingham.

The Middlemores of Northfield were a cadet branch of the ancient family of Middlemore, formerly lords of the Manor of Edgbaston, and possessors of other estates and manors in the counties of Worcester and Warwick from the time of Henry II. to that of George III.

The particular branch of this family from which the subject of this brief memoir descended was connected with the leather trade in and around Birmingham.

Richard Middlemore was born on October 12, 1804, and died March 1, 1891. He was at school at Solihull, and on leaving was apprenticed to Mr. Chawner, of Lichfield, a medical practitioner of repute. At the end of his apprenticeship he became a student at St. Bartholomew's Hospital, and was pupil and dresser to Mr. Abernethy. While a student his chief friend and companion

was Richard Owen, afterwards Sir Richard Owen, K.C.B. This friendship was intimate and lifelong, as a series of letters in my possession show, the last letter from Sir Richard Owen being dated only a few weeks before Mr. Middlemore's death.

At the end of his hospital curriculum he came back to Birmingham, the bearer of a highly commendatory letter to Mr. Hodgson, then the leading surgeon in the Midlands. Mr. Hodgson was a close friend of Abernethy, and one of the witnesses signing the entry of his marriage. Abernethy always seemed to be much interested in the Midlands for he was himself at school at Wolverhampton.

After his return to Birmingham, Mr. Middlemore was Mr. Hodgson's assistant for upwards of ten years in general and ophthalmic practice, and he intended to follow general surgery, but by Mr. Hodgson's advice he confined his practice to ophthalmology. He was elected assistant surgeon to the Eye Hospital in 1828, became full surgeon in 1835, and in 1849 retired to the consulting staff. He was one of the first four members of the College of Surgeons to be created Honorary Fellows; the other three were Birmingham men: Joseph Hodgson, afterwards President of the College; W. Sands Cox, to whom in large degree the establishment of the Queen's College, Birmingham, is due; and Langston Parker, an authority on the treatment of syphilis and its sequelae.

In 1831 he gained the Jacksonian prize for an essay on diseases of the eye. This essay he afterwards enlarged and elaborated, and in 1835 published it in two volumes. This work occupies some 1,600 pages, and, curiously enough, does not contain a single illustration. It was certainly the most comprehensive and painstaking work on ophthalmology existing at the time of its publication. It recorded most honestly the labours of others and was enriched and augmented by the results of his experience and observation. I suppose no one would now read the book except in an antiquarian spirit, but he who so indulges will be struck with the number and value of references to and quotations from authors, ancient and contemporary.

Mr. Middlemore was a most careful reader and student, and has told me that there was not a work in our specialty which he did not read and digest as far as possible. He had a fair reading knowledge of French, but for Italian and German authors he had to depend upon English or French translations. I have often noticed in his later days his reference to the pathology and treatment of eye disease, gathered from current literature, which he kept under constant observation. He was a keen follower of the work of the Vienna school, and Beer was one of his leading lights. He also admired and appreciated the great Italian, Scarpa. Among British surgeons, Lawrence was his exemplar. He was in correspondence for many years with the leading ophthalmologists of Europe and

America, and was made a corresponding member of medical societies of Montpellier and Hamburg.

He delivered a course of lectures on diseases of the eye every year during his connection with the Eye Hospital to students and practitioners; but he was often disheartened, he has told me, by the lack of interest shown. He considered it the duty of all members of our profession connected with public institutions to make the practice subservient to the progress of instruction. His settled convictions on this point found, as he hoped, a permanent expression in the course of post-graduate lectures which he founded and endowed in connection with the Birmingham Eye Hospital in 1889. This course of lectures has been continuous ever since its establishment, the lectures having been delivered by ophthalmologists of eminence. He also endowed a prize in ophthalmology to be awarded by the British Medical Association. He had a profound contempt for the mere oculist, and in his lectures lays great stress on the absurdity of what is called pure specialism. He says—what is now generally admitted to be sound, namely, "that the true and "competent ophthalmologist is he who is conversant with the "natural structure of the parts, with the laws which regulate healthy "function, with the derangements and alterations produced by "disease, with the sympathies, the influences and the connexions "subsisting between every part of the animated machine."

These views were not original, as we all know, but Middlemore, who foresaw a drifting towards pure specialism, did his best to arrest the drifting. He says further, "by far the best works on diseases of "the eyes and beyond comparison most useful discoveries and natural "improvements have emanated from those who studied ophthal- "mology as part of and in connexion with their profession "generally."

Two of his sayings recur to my recollection. The first, "You must diligently search after the cause of the ophthalmic complaint, and treat such cause just as you would do if it did not occasion any disease of the eye, adding local aid;" and the second is, "A good oculist should be a good physician, a good surgeon, and something more."

Very early in his career Mr. Middlemore was impressed with the necessity of schools for the blind, and especially the indigent blind. In 1836 he brought proposals for such an institution before his fellow citizens. The proposal was very coolly received at first, but after some years was adopted, and the present Asylum for the Blind at Edgbaston was established. For some years Mr. Middlemore was consulting surgeon to this institution, and in 1889 he endowed a fund to provide tools or other needful equipment for pupils leaving who were too poor to provide them.

He was a frequent contributor to the *London Medical Gazette*

and other journals, and sent yearly reports of the work of the Birmingham Eye Hospital to the *Provincial Medical Reporter*, then published in Worcester, under the supervision of Dr. Charles Hastings. He had previously endeavoured to found a provincial medical journal of wide scope, and joined heartily in the early efforts to found the Provincial Medical Association, which eventually became the British Medical Association.

In his practice he was much influenced by his old master Abernethy, whose views on what is now called auto-intoxication he adopted and developed. In his notes of his cases he was most careful and minute. His views of the causes and pathology of eye disease were those of his time, and they are now for the most part obsolete; still, some of them show an insight which in the absence of the ophthalmoscope and other aids is remarkable. For instance, his notion of glaucoma is interesting. He believed it to be due to inflammation and destruction of the hyaloid membrane and the resulting increase and deterioration of the vitreous fluid. He recognized increase in hardness of the globe of the eye due to increase of the vitreous fluid, and he attempted relief by a puncture of the sclera with a grooved needle, and so allowing the fluid to drain off, as he called it, and he claimed to have had successful cases. I am speaking now of his earlier and teaching years; later in life he assimilated the advantages of research and appreciated them, for he was a man of receptive mind.

As an operator he was, I have been assured by his frequent assistant, Mr. Townsend, who was for some years one of the surgeons to the Eye Hospital, very deliberate and neat. He especially derided the oculist who, as he said, operated from the elbow. In cataract extraction he held it essential to a good corneal section that even the wrist should be moved as little as possible. The propulsion of the knife should be by means of the movement of the thumb and first and second fingers only. He used a triangular knife, a sort of compromise between the old Beer knife and that of Sichel, with a carefully thickened blade, which would fill as far as possible the corneal incision as the knife advanced, and so retain the aqueous. He used the lower section, and, of course, did not employ iridectomy.

He did not regard the escape of vitreous with the fear which oppresses most of us. In a hard eye he even thought it a possible advantage. He applied cold, if possible iced, water pads to the closed eye before operation, as he said, to lessen sensitiveness and haemorrhage. I once saw him operate when I was a student in the early sixties. It was a lower section and the patient did well; but I knew nothing of ophthalmic operations then, and beyond the fact of the operation seeming to me a very easy one and most dexterously performed, I cannot criticize it.

Mr. Middlemore was an exceedingly modest man, and of very tolerant judgment. He was free from any self-assertive manner, and in consequence often gave others the impression of a diffidence which was really due to his habit of carefully weighing matters before decision. When once he had made up his mind he was firm. He had a quiet, rich humour, which those who knew him well appreciated, but he was very reticent, and did not readily admit persons to his confidence. He was scrupulously conscientious in his dealings with his brethren; simple, kind, generous, and always maintained a high standard of professional life.

As one who knew him intimately in his late years, and one greatly indebted to him for assistance and guidance in early life, I am happy in having this opportunity of making permanent this memoir of Mr. Richard Middlemore.

COMMUNICATIONS

ON THE CHARACTER AND THE TREATMENT OF SCROFULOUS INFLAMMATIONS OF THE EYE[1]

BY

L. K. WOLFF,

OCULIST-BACTERIOLOGIST; FIRST ASSISTANT IN THE LABORATORY FOR HYGIENE OF THE AMSTERDAM UNIVERSITY.

NOTWITHSTANDING a great many experimental and clinical observations, and notwithstanding ingenious reasonings during the past 80 years, we have not advanced very much in our study of the phenomena of scrofulous inflammation of the eye, nor have the methods of treatment undergone any important change. About 1850, Mackenzie, the famous English oculist, wrote[2]: "We must confess that in many cases this inflammation of the eye, i.e., the scrofulous one, is very obstinate. When we are asked why it does not yield to the best treatment, we, in turn, ask why is it that in a scrofulous individual the inflammation of the glands of the neck is so obstinate, continues to discharge pus, notwithstanding all remedies. . . It is the scrofulous constitution which causes the extremely long duration of this inflammation of the eye, just as it is responsible for the long duration of the other scrofulous inflammations, and as long as we have not found a radical remedy for scrofula, this inflammation will mock at the best combined and most accurately applied method of treatment."

Not much has changed since that time. The local treatment may have improved to some extent, but it cannot prevent relapses,

and the general treatment of scrofula has certainly not improved markedly since then. We do know that a stay in fresh-air colonies, especially at the seaside, can, together with good nourishment, do our scrofulous children much good. But for a great many this is unattainable; for others, four or six weeks in the summer are far too little, so that very soon after their return to their families they lose their colour and their healthy looks, and again show all the signs that characterize scrofula.

In this essay I hope to show that we are now in possession of a really efficacious and harmless remedy with which to combat scrofula.

In this report I shall, for the time being, confine myself to scrofulous inflammation of the *eye*, although I wish to say that this method can also be applied to other scrofulous conditions.

It would lead me too far to enter upon a discussion of all theories concerning scrofula here. I understand scrofula to be a particular form of tuberculosis, viz., of the system of the lymphatic glands. This tuberculosis is generally caused by the human tubercle bacillus, sometimes, however, also by the bovine bacillus, especially in England, as opposed e.g., to Paris, where the bovine bacillus has seldom been found. We have not yet any data at our disposal concerning the nature of the tubercle bacilli in Holland.

In tuberculosis of the lymphatic glands, the glands of the neck and head are the ones most frequently affected, sometimes also the axillary and the supra- and infraclavicular glands, very seldom the inguinal ones. I have no data about the thoracic glands, but from the success of my therapy it would seem that these are not markedly affected in most cases.

An extensive examination of more than one hundred cases has taught me that pulmonary affections are very rare, as far as they can be detected by percussion and auscultation (as far as I am concerned, I have never found them).

With adults symptoms of scrofula are not so very rare, although this fact is hardly mentioned in the literature.[3]

We often find in scrofulous patients scrofulous inflammations of the eye. Von Pirquet's reaction has taught us that where we find this inflammation of the eye, even without any other evident symptoms of scrofula, tuberculosis is present. According to the observations of others and of myself this reaction is positive in 90 to 100 per cent. of all cases. Very early in the bacteriological era staphylococci were nearly always found in the conjunctival sac of phlyctenular patients. The non-ulcerating phlyctenule, however, contains neither staphylococci nor tubercle bacilli. Its histological construction does not resemble tuberculosis very much, but is more like an ordinary inflammation.[4]

Experiments on animals to produce phlyctenules either with

tubercle bacilli or with staphylococci or with the poisons of both, have only had unsatisfactory results. The experiments have now and then succeeded in producing a small nodule, the size of a pin's head, which histologically resembled the human phlyctenule, but the great difficulty of producing them and the slight inflammation which results, scarcely justify us in classifying these formations with human phlyctenules. And yet some theories have been based on these experiments, accounting for all the phlyctenular inflammations of the eye.

Whereas Axenfeld in his "Bacteriologie des Auges," does not pronounce a definite opinion, Rosenhauch[5], after a series of experiments, has expressed a theory which has also been defended by Straub in earlier years on clinical grounds, that the phlyctenules are formed by the co-operation of internal (tubercle toxins) and external causes (poisons of other bacteria, especially of the staphylococcus aureus). The success of his experiments, consisting in bringing staphylococci into the eyes of tuberculous guinea pigs after scarification of the conjunctiva could not be obtained by later experimenters. I have had no success either.

Straub[6] has given us his opinion that in persons with latent tuberculous foci, débris of tubercle bacilli or of the diseased tissues enter the circulation, and can produce metastatic tuberculosis. This metastatic tuberculosis is generally an attenuated tuberculosis. In principle there is not a great difference between scrofulous inflammation of the eye, and a mild form of tuberculosis (keratitis diffusa tuberculosa, cyclitis, choroiditis, iritis serosa, scleritis).

Rubert[7] is of about the same opinion as Rosenhauch. He thinks that a tuberculous infection of the organism is necessary for the production of phlyctenules. But besides some external irritant is necessary, e.g., toxins of staphylococci, chemical substances, diseases of the nose, irritation by light. Rubert does not believe in a so-called hypersensitive reaction.

Stargardt[8] thinks that phlyctenular inflammation of the eye is real tuberculosis, which is caused by bacilli in conjunctiva and cornea, but that a very particular degree of immunity must be present for its production, as is also recognized in the milder forms of internal tuberculosis.

Finally, Weekers[9] believes that the phlyctenules are caused by tuberculous toxins. He compares the phlyctenules with the tuberculides of the skin and anatomically he also finds a great similarity in their construction. All these theories agree in so far that the phlyctenule is a manifestation of tuberculosis. But they leave a number of clinical facts unexplained, which I shall now mention.

(1) We know that scrofula is a localization of the tuberculous process in the lymph glands. Why is it then that we do not meet with phlyctenules when tuberculosis is confined to some other

localization, viz., pulmonary tuberculosis (phthisis), abdominal tuberculosis, tuberculosis of the kidneys? These processes can also be mild and can be cured.

(2) Straub[10] has indicated that in children having a so-called mild tuberculosis of the eye, we see the same concomitant symptoms as in children having scrofula. I have extended this investigation to adults with a mild form of tuberculosis of the eye, and I am in a position to state that almost without exception these patients have swollen lymph glands of the neck and head. This phenomenon is so constant that at the present time it is of aid to me in diagnosing the tuberculous from the other chronic diseases of the eye. I may thus maintain that benign tuberculous affections of the eye almost exclusively appear in scrofulous individuals, or in those who formerly were scrofulous.

(3) Scrofulous conditions of the eye very often only affect one eye and recurring attacks only affect that eye. It is difficult to explain this by metastasis. In such a case the right and left eye will probably have equal chances of being affected.

(4) In scrofulous children phlyctenules sometimes appear after instilling tuberculin (test of Calmette).

Weekers obtains the same result in animals, but undiluted tuberculin must be repeatedly instilled, and success was obtained almost exclusively in tuberculous animals. Besides, the phlyctenules are very small. Phlyctenules also appeared after a subcutaneous injection of tuberculin (I once saw a phlyctenule after exposing the lymph glands of the neck to Röntgen rays: post or propter?).

(5) As far as I know, phlyctenules do not appear spontaneously in animals, even after the test of Calmette.

It will be evident that these well known facts cannot easily be accounted for by the above-mentioned theories. If we accept, together with Straub, Stargardt, and Weekers, that the phlyctenules are tuberculous metastases, either of living bacilli or of toxins, the often occurring unilaterality is hardly to be explained.

Besides, why do we not find these metastases in pulmonary tuberculosis, where toxins, and very often living bacilli, certainly enter the bloodstream. Stargardt said that for their production a very distinct immunity must be present. Do they occur in tuberculosis? Certainly we know since Koch and later Römer thoroughly investigated this matter, that an organism reacts in a different way from injected tubercle bacilli, according to whether it was formerly tuberculous or healthy. In the latter case the process lasts very long, in the former it has a stormy progress, but is cured much sooner. It is well known that tubercle bacilli injected subcutaneously into a healthy guinea pig, only produce an ulcer after some weeks, which generally remains till the end of its life.

In a tuberculous guinea pig, however, this ulcer appears after a few days, and is cured again after some weeks.

We also know that tuberculous organs react in a very specific way to the injection of the tuberculous poison, tuberculin, in the body. We then get a violent, very often a haemorrhagic inflammation of the affected organ, whereas the organs which are not affected do not react at all.

We are familiar with a similar phenomenon in other bacterial inflammations, e.g., by staphylococci and trichophyton. Here we see sometimes the phenomenon that after an injection of the bacterial poison the healed spots become inflamed. As an example hereof I may mention a case under my own observation of a patient who had several times gone through a cycle of furuncles. When I injected the patient for the first time with staphylococcus vaccine, after the method of Wright, he not only had fever (a general reaction), but also a reddening of all the spots of the skin, where furuncles had been formerly, although before the injection nothing was to be seen of them.

So in chronic infectious diseases we see immunity and hypersensitiveness reactions appearing side by side. Besides, we have learned from the above that these reactions may affect certain organs or parts of organs locally, and that these reactions may occur more especially in those places which have been the seat of a former process which has been cured.

If we apply this knowledge to phlyctenular inflammations of the eye, we must, in my opinion, also accept here *that the patient has had a tuberculous process in his eye before, which, however, was cured by the natural power of resistance of the organism. That eye has now become hypersensitive to the tuberculous poison.*

Now we only have to accept *that tuberculous poisons are now and then mobilized out of the tuberculously inflamed lymph glands.* It is almost self-understood that this will especially be the case when the external surroundings of the patient are unfavourable. Hence the manifold appearance of phlyctenules in poor scrofulous children, and also after intercurrent diseases, e.g., measles. I cannot yet decide whether external influences affecting the eye can also co-operate (e.g., the very frequent appearance of phlyctenules in trachoma).

As a proof of the first part of this hypothesis I may add that Schreiber[11] has told us that in 25 per cent. of his 200 cases of phlyctenular inflammation of the eye he found tuberculous foci, or the scars thereof in the chorio-retina.

That phlyctenules do not appear spontaneously in animals may be explained by the fact that the human being is the most sensitive organism for tuberculin.

But the localization of tuberculosis as is seen in scrofulous

patients is only seldom met with and consequently this is also the case with the primary foci in the eye.

As far as I could conclude from the literature that was at my disposal, only pigs seemed to show symptoms of isolated tuberculosis of the glands of the neck and head now and then. It will be interesting to examine the eyes of these animals with such inflammations minutely when more pigs are being killed again. The pig, however, is much less sensitive to tuberculin than the human being. And therefore we can understand why phlyctenules in these animals are not reported. But still some difficulties remain, such as the simultaneous appearance of eczema and phlyctenules which is so often seen in scrofulous children. It would lead me too far to discuss the entire eczema theory here, but in the light of what has been mentioned above, I may say that the staphylococci also play a secondary part in the eczema, that they generally appear in scrofulous persons in certain places, in the corners of the nostrils, near or behind the ears, etc., and that I do not think it improbable that primarily those spots have also been the seat of tuberculous foci which have not been detected. The rest can then be accounted for the same way as in the eyes.

The fact that scrofulous patients generally react more strongly to tuberculin than other tuberculous patients, as seen in the results of the skin reactions of von Pirquet, is another support of our opinion.

The experimental phlyctenules do not quite belong to the cadre of our theory. But first of all we should not forget that the results obtained are very small and insignificant, and almost exclusively appear in tuberculous animals. Now we know that in individuals with tuberculosis the non-affected organs are more sensitive to tuberculin than those in normal persons, e.g., reaction of von Pirquet, and consequently these, though very insufficient experiments with the animals, do not seem to be contradictory to my theory.

I think it is very difficult to ascertain whether phlyctenules are caused by living bacteria or by dead ones or by their poisons. As far as I am concerned, I am of the opinion that the phlyctenules are caused by dead bacilli or poisons, considering the transitory character of the process and the rapid recovery, as well as the phlyctenules after instilling tuberculin. So the mild tuberculosis of the eye would be caused by living bacilli. But this opinion of mine has not been founded on more definite experiments so far. The inoculation of animals with the material from benign tuberculosis of the eye has only met with success in the smallest number of cases.

My hypothesis is most closely related to that of Stargardt, which coincides with my own in other things too, especially in the facts and phenomena observed in tuberculosis of the skin. It is a new

observation, however, that I make when saying that I think I may take for granted that *a primary tuberculous focus has existed in the eye itself (which explains its hybersensitiveness) appearing at the same time as, or shortly after the invasion of the lymph glands by tubercle bacilli, but which is cured again without having shown many symptoms.*

I must say a few more words about the staphylococci. I consider their rôle a secondary one, but notwithstanding that fact not without importance. In many diseases we now see certain bacteria appear regularly, although these bacteria are not the cause of the disease. I shall only mention the paratyphus bacilli with hog cholera, the streptococci with scarlet fever, the proteus bacilli with typhus, the strepto- and pneumococci with influenza. In the more advanced stages of pulmonary tuberculosis the streptococci probably also play an important part. In all these diseases the resisting power in the body against these secondary bacilli is probably weakened, so that they can exert their deleterious effect. I look upon the influence of the staphylococci in the inflammations of the eye which we are discussing in exactly the same way. They can intensify secondarily the ulcers of cornea and conjunctiva. In consequence therefore one must certainly take these bacteria into account where the therapy is concerned.

What, then, as a result of the above-mentioned view, are the consequences we must draw concerning the therapy of our scrofulous inflammations of the eye? We must be able to influence the process in two ways:

(1) By removing the tuberculous foci, which, in the broadest sense of the word, send out the tubercle poisons.

(2) By decreasing the eye's sensitiveness to tuberculin.

The second method has been tried repeatedly by injecting tuberculin, the tuberculin cure. With the exception of a single report of good results in the literature, it has not had much success. Perhaps one has not had enough patience or faith in the treatment. But this treatment is certainly a very long and difficult one. Personally, I have not had the slightest success with it. The first method promises more, for it is not impossible to remove the tuberculous foci in scrofula surgically in a great many cases, and this very often produces good results. The first case I remember concerned a girl who had been treated for more than half a year in Prof. Straub's clinic where I was then house-surgeon. Every time when she was at the point of leaving the clinic she had a recurrence. Although at that time we only had a vague idea of the aetiology, we decided to take away the lymph glands after prolonged discussion of the matter, and after the operation there were no more recurrences.

Since then a few other cases were operated upon; but the

comparatively severe character of the operation was a great drawback; also the possibility of miliary tuberculosis after the operation. Besides renewed inflammation of the lymph glands occurred rather often, which had a disheartening effect upon the patient. Still, this first observation has deeply impressed me, and when in 1915 I received a patient with the worst scrofulous inflammations I had ever seen, who had not only facial lupus, but also many lymph glands that could easily be extirpated, I again proposed the operation, and I have had very good results. The girl, who for years and years had had relapse after relapse, and who had also been treated in a university clinic for a long time, had no more relapses during the half year she remained under observation. Very soon afterwards I saw the favourable results of the treatment with Röntgen rays on tuberculous lymph glands, and I immediately understood that this must be our treatment of scrofulous inflammations of the eye. I found my colleague, Dr. van Ree, willing to treat my patients with X rays, and I can show you the result by the following table:

	Duration of the eye disease	Which eye was affected.	Present age.	When X rayed.	Number of exposures.	How long without relapse.	General condition at present.
(1)	2 years	R.L.	24 years	1916	4	2 years	Good.
(2)	2 ,,	L.	21 ,,	1916	2	1½ ,,	Good.
(3)	2 ,,	L.	9 ,,	1917	4	1 year	Relapse, glands of the neck.
(4)	17 ,,	R.L.	21 ,,	1917	5	1 ,,	Very good.
(5)	1 year	R.	29 ,,	1917	10	1 ,,	Relapse, glands of the neck.
(6)	2 years	R.L.	27 ,,	1917	4	1 ,,	Good.
(7)	1 year	R.L.	26 ,,	1917	5	1 ,,	Very good.
(8)	7 years	L.	9 ,,	1917-18	5	¾ ,,	Good.
(9)	2½ ,,	R.L.	13 ,,	1917-18	5	½ ,,	Good.
(10)	2 ,,	L.	17 ,,	1918	2	3 months	Good.
(11)	9 ,,	L.	37 ,,	1916-17	4	1 year	Very good.
(12)	7 ,,	R.	13 ,,	1917	6	Relapse; remained away during treatment	Relapse, glands of the neck.
(13)	3 ,,	R.L.	18 ,,	1917-18	4	Relapse	Thoracic glands.
(14)	1 year	L.	37 ,,	1916	4	1917	

So on the whole the results are very good.

Of course, I only had those cases exposed which relapsed repeatedly. I must say a few more words about my bad cases, 11, 12, 13. Case 11 had one very small phlyctenule in the course of the year, but has recurring attacks in the lymph glands. Case 12 has not come back to me after several X ray treatments, but was treated somewhere else. At a re-examination she had several recurring attacks in the lymph glands. Case 14 cannot be considered.

But about case 13 I must speak a little longer. Her lymphatic glands of the neck had been exposed to X rays, and at first with success. For half a year she did not complain, but now a phlyctenule period has come again, and yet there is little enlargement of the lymph glands of the neck. I have had the patient examined very carefully, and now it appears from the Röntgen-photograph that she has a distinct tuberculosis of the hilus glands. These we shall now have treated, and in this way we still hope to obtain a good result. She is now again three months without complaints. I must confess that I do not know anything definite about the hilus glands of the other patients. I examined their lungs as well as possible, and I never found any morbid symptom. I must admit, however, that a Röntgen examination of the hilus glands of the other patients belongs in the cadre of my work. Up to this time, however, I have never felt the need of it because the other cases progressed well without X raying the thorax, and from this good result I may conclude that the thoracic glands are probably not affected very seriously in most scrofulous patients.

The exposure took place every three weeks. In my patients no other surgical intervention has been necessary. When there is a marked softening of the glands the process of recovery can be hastened by aspiration of the pus. The X raying took place after filtration through an aluminium filter of 5 mm. and after exclusion of the secondary rays by means of felt. Each time 4 H. were given at the utmost. When the lymph glands relapse it will be necessary to give another series of X ray exposures after a year, perhaps. No unfavourable symptoms were noticed after the exposures. Sometimes the patients complained of a dry mouth and a little pain in the throat, and sometimes the neck was somewhat red and swollen after the exposure. Only a very few times the patients got a general reaction, viz., fever, but it was never violent and soon passed away.

Besides, as already mentioned, once after an exposure phlyctenules appeared. When examining the patients again, it appeared to me that the exposures had not only kept away phlyctenules, but had also benefited them in other respects. Some told us spontaneously that they felt much better and stronger after the treatment.

This was also to be seen by their external appearance. I think this of enough importance to be mentioned because the question arises whether other forms of scrofula, without the eye symptoms, should not also be treated with Röntgen rays. As far as I am concerned I should answer this question in the affirmative.

So I think I must conclude that *patients with a recurring phlyctenular inflammation of the eye must be treated by exposing their tuberculous lymph glands to the X rays.*

The phlyctenules themselves are not influenced by the exposures, nor are the ulcers of the corneae. Once in a while one remains powerless against these processes, and it seems hard to check the process notwithstanding the ordinary therapy, as washing of the eye, Pagenstecher's ointment, calomel, cauterization with the platinum wire, etc. I have, therefore, been trying to find a means of preventing the staphylococci from doing harm, as I consider them the most guilty elements in these serious cases. We have seen from Römer's investigation how ineffective our disinfectants are in the conjunctival sac, and how soon the chemicals are diluted and enter the nose with the lacrymal fluid. I have already pointed out that in my opinion much more is to be expected of disinfectants which do not easily dissolve, which, when introduced into the conjunctival sac in the form of powder or salve will, when dissolving, produce their effect in a concentrated form. The zinc fluorescein[12] which I recommended in the diplobacillus conjunctivitis is of no use in the case of staphylococcus.

After that I considered the silver fluorescein recommended by Bruch for gonococci, which can only be dissolved in distilled water up to 2 per cent.; it is a red powder which dissolves very quickly, also in the lacrymal fluid. The saturated solution is not painful and is harmless to the eye. This solution in distilled water at once kills staphylococci (my own experiments). In a salt solution it works less strongly, being slowly changed to AgCl. As the lacrymal fluid also contains much NaCl (+0·4 per cent.) the effect in the conjunctival sac is not yet ideal, but, in my opinion, better than that of all the other familiar remedies. The main thing is that it penetrates into the conjunctival sac thoroughly. I generally used a 5 per cent. salve in white vaseline, and had some of it rubbed into the conjunctival sac every hour. This treatment is not painful and gave me very good results in some cases. An extremely obstinate case of ulcerated cornea in a little patient who was treated very thoroughly, but with whom cauterization did not help, was cured after two days. With obstinate blepharitis it often had a good effect too.

I wish finally to say a few words about the mild tuberculosis of the eye. As a matter of course, I also used the method of X raying the lymph glands of the neck here, and with this disease, too, I

have seen its good results. Four cases have had no relapses up to the present time, only one had. The process itself, however, is not influenced by it, and this is of cardinal importance as opposed to the phlyctenular inflammation of the eye. Where, in other parts of the body we had seen such good results from the X rays on the tuberculous process of inflammation, it was evident that it would be wise to try also to expose the eye itself to X rays.[13] From Axenfeld's reports we know that this is really possible without injuring the retina, but his patients, who had tumours in the eye, were afflicted with cataract after some years. That is why I hesitated a long time before doing it. By chance I am in a position to state that careful X raying with no more than 1½ H. every three weeks and filtration through 5 mm. aluminium, does not injure the eye. In 1916, a patient with melanosarcoma conjunctivae was treated with X rays after the tumour had been extirpated. More than two years later, in 1918, this treatment had not injured the eye at all. The lens was still perfectly clear. A recurring attack of sarcoma obliged me to extirpate and then I could determine that there were no histological alterations. So I have finally applied this method to some cases which I had observed quite a long time, and which had become worse notwithstanding all kinds of other therapy. Some of them seem to have had much benefit from it. The time of observation is too short to form a fixed judgment about the method. So I shall not say more of it now, although I myself am firmly convinced of its future.

Conclusions

First, a somewhat modified theory has been given of the aetiology of phlyctenular eye inflammations.

Second, in connection with this theory a new method of treatment is given, viz., the exposure of the lymph glands of neck and head to X rays.

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4. Cp. **Weekers'** Dissertation.
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13. Whether the radium exposure, according to Prof. Koster, with 5 mgr. radium not filtered, influences the tuberculous process according to the same mechanism, I am not in a position to decide. That the treatment with Röntgen rays can have another effect than that with radium, according to Prof. Koster, is apparent from a calculation of Dr. E. H. Büchner, which shows that, roughly calculated, in my manner 100 times more energy per time unit is absorbed by the eye than with the exposure with 5 mgr. radium.

REPORT OF THE OPHTHALMIC WORK DONE IN THE MESOPOTAMIAN EXPEDITIONARY FORCE DURING 1917 and 1918

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PRACTICALLY all the eye work of this force during the years 1917 and 1918 was done at the three ophthalmic centres of Busra, Amara, and Baghdad. It is found from experience that in a comparatively small branch of medicine such as ophthalmology it is much more satisfactory for cases in any given area to be examined and treated at a centre by an ophthalmic specialist than for each hospital to treat its own cases. The reasons for this are as follows:

(1) The average medical officer's knowledge of eye disease is very limited. Cases were constantly being sent in as cataract when the lenses were perfectly clear, the grayish colour of the lens of an elderly patient being mistaken for opacity. Most cases of inflammation were returned as conjunctivitis and had been treated with boric lotion.

(2) It obviates the same case being examined several times over. A man with an error of refraction might report sick at one hospital after another, but where there is a special centre this is impossible.

(3) It prevents unnecessary evacuation. When I was at Busra I was constantly having cases sent down which need not have been; for instance, a coolie with an old leucoma or a quiescent pterygium. In the earlier years of this campaign a large number of men suffering from artificially produced ophthalmia succeeded in this way in being invalided to India. This was before ophthalmic centres were established.

(4) It is more economical as regards the provision of drugs and equipment.

Number of cases examined during the years 1917 and 1918.

British	8,641
Indians	11,020
Total	19,661

Spectacles supplied

British Troops ...	3,430
Indians	1,021
Total	4,451

Most of the Indians supplied with spectacles were clerks. As the Indian troops are enlisted voluntarily, the standard of vision is higher than amongst the British, and so the necessity for supplying Indian soldiers only very occasionally arose. It is a noteworthy fact that presbyopia comes on earlier in Indians than in Europeans. The average Indian with normal refraction requires spectacles for reading at the age of 40, whereas the average European does not require them till 45 or over.

Operations.—With the exception of emergency operations for glaucoma or injuries, etc., only such operations were done as were likely to render men who were incapacitated fit to return to duty within a comparatively short period. Cataract cases were, as a rule, invalided.

Number of operations performed ... 638

Excision of Eyeball

British	20
Indian	36

During 1918 several of the excisions were performed under local anaesthesia. After cocainizing the eye, 2 cc. of a 2 per cent. solution of novocaine were injected along the course of each rectus muscle into the back of the orbit and after 20 minutes the eye was excised. Some of the operations were quite painless, whilst in others only slight pain was complained of. This method is particularly suitable where the inflammation is not very acute, and, of course, it has the advantage over a general anaesthetic that it does not expose the patient to the same risk and it enables an operator to undertake an excision single handed. Most of the excisions performed were for injuries, but a few for an irritable anterior staphyloma.

Pterygium

British	14
Indian	61

This affection is much more common amongst Indians, probably owing to their greater exposure to dust and glare. In fact, amongst

Indian coolies it is more or less the normal condition. Operation was performed only where the pterygium was obviously progressing and was usually done by the Arlt method.

Excision of lacrimal sac

British	...	...	22
Indian	...	...	57

All the cases were ones of long standing dacryocystitis in which nothing short of excision would have been of any use. The operation was in all cases performed under local anaesthesia. The results were on the whole satisfactory. In some cases a troublesome epiphora remained, and, of course, for a man in military employment who is not keen on serving, a condition of this kind gives him an opportunity of reporting sick at all times.

Entropion and trichiasis

British	...	...	4
Indian	...	...	142

This affection occurred mostly in Indians, and in all cases was the result of long standing trachoma, which is so common among them. The operation usually done, and the one that on the whole gave the most satisfactory results, was a modified Snellen, such as is done at Bombay Ophthalmic Hospital. An incision, about 3 mm. from the edge is made along the whole length of lid. The ends of this incision are joined by a curved incision and everything is excised down to the cartilage. Then a wedged-shaped piece of the tarsus is excised, the point of the wedge towards the conjunctiva. It is of no importance whether you remove a piece of the conjunctiva. In fact it is difficult to avoid doing so. Three to four sutures are then passed through the upper lip of the wound, then through the upper portion of the tarsal plate out through the skin between the lower lip of wound and edge of lid. I have seen several such cases months later and was scarcely able to see the scar. It ensures good eversion of the lid and leads to no deformity.

Glaucoma operations

British	...	...	6
Indian	...	...	13

Glaucoma is naturally not very common in the Army as the bulk of the men are under 40. Most of the cases operated on were chronic cases. In all such I performed Elliot's trephining and the results, so far as I observed, were good. In the acute cases iridectomy was performed. In one of the most acute cases I performed the operation after a subconjunctival injection of 2 cc. of 2 per cent. novocaine solution along the internal and external rectus muscles. The patient apparently had no pain. I consider this method preferable to operation under a general anaesthetic, as

there is no danger from vomiting, such as you have so often after a general anaesthetic. I think this method has a future, and I mean to adopt it as a routine measure on my return to Bombay.

Commoner Diseases

(1) *Conjunctivitis.*—In a country such as this, with so much dust and glare, this was naturally a common complaint. The number of cases treated at the ophthalmic centres was as follows:

British	...	...	969
Indian	...	...	1383

Only one case of gonorrhoeal ophthalmia occurred, so far as I am aware, during the two years. Amongst the British the mucopurulent and chronic variety were about equally common. The chronic variety was often of an angular nature, and in many cases the Morax bacillus was found.

The muco-purulent variety was never of a very acute nature and was more common amongst Indians than the chronic variety, which was comparatively rare amongst them. The results of the bacterial examination in the muco-purulent variety were not very definite. A particularly troublesome form of conjunctivitis occurred in which the cornea was implicated. Patients complained that when exposed specially to dust and glare, as after a long march, their eyes got red and their vision became blurred. In these cases there was injection of the lids and bulbar conjunctiva and fine staining of the cornea on the application of fluorescein. One had to use the corneal loupe as a rule to make out the staining. The condition improved when the patient was resting in camp, but was very apt to recur on exposure. The corneal staining persisted in some cases, even after the disappearance of the bulbar injection. Zinc sulphate, gr. 1 to 1 oz., and the wearing of glare glasses seemed to give the most satisfactory results. For the muco-purulent variety, painting of the lids with a solution of silver nitrate, grains 10 to the ounce, was used with satisfactory results.

The comparatively small number of cases of conjunctivitis amongst Indians is accounted for by the fact that many cases of conjunctivitis occurred in those with old trachoma and have been shown under that heading.

Trachoma.—The number of cases in the two years was:

British	...	...	39
Indian	...	...	7,845

It will be seen from these figures that the disease was practically confined to Indians. Several of the European cases gave a definite history of having suffered from this affection before coming to Mesopotamia.

Amongst the Indians the trachoma was of long standing, and had not therefore been contracted in this country. Men with old trachoma are more subject to attacks of conjunctivitis. In fact, many of the cases shown under this heading were cases of conjunctivitis arising in this way. Such men are also very apt to ascribe some corneal complication of this disease to injury, and claim compensation.

Captain Doyne, ophthalmic specialist, Baghdad Centre, and I inspected several schools, some of the police, and a portion of an Arab labour corps, with a view to ascertaining the prevalence of this disease amongst the natives of these parts. We divided them into three categories, as follows, namely:—

(1) Lids affected and pannus present.
(2) Lids definitely affected.
(3) Lids unaffected, or with only a few follicles present.

The results of our investigation were as follows:—

Schools—		
(1) Lids and pannus	8	per cent.
(2) Lids only	53	„
(3) Suspicious or free	49	„
Police—		
(1) Lids and pannus	6	„
(2) Lids only	41	„
(3) Unaffected or suspicious	53	„
Labour corps—		
(1) Lids and pannus	11	„
(2) Lids only	57	„
(3) Unaffected or suspicious	32	„

Our examination for pannus was a naked eye one, so that it was only the very obvious pannus that was detected. In cases of trachoma one often discovers, by means of a corneal loupe, fine pannus present, when one has not suspected its presence at first sight.

Probably the figures for the Arab labour corps give one the best idea of the prevalence of the disease, as it is composed of persons of all ages and both sexes, and is drawn from the poorest class which forms the bulk of the population. No doubt many of the cases classified as suspicious had the disease. A few follicles in a European eyelid signify very little, but in the Arab they are much more significant. Our estimate, therefore, errs on the side of being perhaps too low.

Considering how prevalent this complaint is, it is very gratifying to know that so few of the troops have been affected. Chronic trachoma, so far as my experience goes, is not very infectious, and

I presume only spreads when men are living in crowded and badly ventilated barracks and amidst general insanitary surroundings.

We made no attempt at so-called radical treatment. Our treatment consisted in painting the lids with solution of silver nitrate, gr. 10 to the ounce, or in some cases touching with solid copper sulphate. Complications such as entropion we treated by operation. In a large percentage of cases after such treatment, the men were fit to return to duty after a few weeks.

The average medical officer as a rule fails to recognize this disease and returns it as conjunctivitis, or where there is pannus present, as iritis or keratitis. That is quite natural, as most medical officers from England have had no opportunities of seeing this disease. It is a golden rule in Oriental ophthalmic practice always to evert the upper lid.

Artificially produced ophthalmia.—Number of cases in two years: 255.

No case occurred amongst the British troops. All the cases occurred amongst Indians. At the Baghdad centre there were 164 cases. During the same period and at the same centre there were 401 cases of conjunctivitis. That gives one an idea of the prevalence of this complaint. The agents used for producing this affection were croton, castor, and jequirity seeds. The jequirity seed was the most popular. Any of these seeds can be easily purchased in the bazaar. The inflammation produced by jequirity is very characteristic and when once seen should never be mistaken. A small piece of the pulp of this seed is applied as a rule to the lower fornix. This within 24 hours gives rise to well marked chemosis of the fornix and lower part of the bulbar conjunctiva, with in most cases a well marked slough at the middle of fornix and lower lid. The extent and depth of the slough of course will vary with the length of time the irritant has been applied. We found in one case by applying a small piece of the pulp to the lower fornix for 20 minutes, a typical inflammation resulted within 24 hours with a moderate slough at the middle of the lower fornix. In a case that came under my notice, the slough formed a membranous covering, resembling one of the coats of an onion, which concealed the entire cornea. On picking this off with a pair of forceps, I found the cornea intact and that this membrane arose from a deep slough in the lower fornix. In only one case have I seen the cornea damaged at all by this inflammation. Occasionally a more enterprising individual applies the irritant to the upper lid as well, and then one gets marked swelling of this lid and some sloughing of its conjunctiva. In the majority of cases, however, the inflammation is limited to the lower lid and lower part of eyeball, the upper lid being perfectly normal. Where both lids are affected there is an excuse for a medical officer mistaking the case for an early stage of

gonorrhoeal ophthalmia. The deep slough in the lower fornix, the absence of discharge, and the subsequent course of the case should differentiate this condition from gonorrhoeal ophthalmia.

Castor oil seeds have a much milder effect and in some cases it is difficult to be absolutely certain. In many cases in which this irritant was used there was only redness of lower lid and chemosis of the lower fornix and lower part of the bulbar conjunctiva. In others, in which no doubt the irritant had been applied longer, there was a distinct but much more superficial slough than one gets from jequirity. Where no slough was present the finding of the seeds on the patient's person confirmed one's suspicions. Croton oil seeds were not much used. In the few cases I saw, the condition resembled greatly that produced by jequirity.

Medical officers rarely diagnosed this condition as such and returned it as injury or gonorrhoeal ophthalmia, usually being misled in the former case by the patient's statement or in the latter from a vague idea as to the appearance of gonorrhoeal ophthalmia. They seem to forget that gonorrhoeal ophthalmia is a comparatively rare condition in adults.

A conjunctivitis, especially if unilateral and there is nothing obvious to account for it, should always arouse suspicion and should be kept under close observation.

Before the establishment of ophthalmic centres many cases of this affection were invalided to India, medical officers failing to recognize their nature and finding that they did not improve under treatment.

I noticed in a few cases that there was a coincident venereal or so-called venereal sore on the penis. I have no doubt this was produced in the same way as the slough in the artificial ophthalmia, in order doubly to insure evacuation to the base.

Corneal Ulcer

British	...	...	386
Indian	...	...	1,294

British.—Only six cases of hypopyon ulcer were reported. The majority of the ulcers were of the superficial variety and many of them were of a dendritic character. The latter usually followed some febrile attack such as malaria or sandfly fever. In some of these touching with absolute alcohol and in others the administration of quinine internally gave good results, but many had to be invalided to India. I consider that a corneal ulcer is always a sign of lowered vitality and that constitutional treatment in the way of a change of air is the best remedy. A sea voyage for a few days will often heal a corneal ulcer which has resisted prolonged local treatment.

Indian.—Hypopyon ulcer was much more common amongst

Indians and accounted for close on 10 per cent. of the total numbers of ulcers amongst them. This is mainly due to the fact that the vitality of many of the Indians was not very high and so they fell an easy prey to this affection after some slight abrasion. It may also be that Indian followers in their capacity as mule and bullock drivers are more exposed to corneal abrasions, the animals often swishing their tails in their faces. I found that a sub-conjunctival injection of 10 minims of a solution containing 6 minims of a 1 in 2,500 solution of cyanide of mercury and 4 minims of a 4 per cent. solution of cocain had often a very beneficial effect. A large number of the ordinary ulcers amongst Indians were associated with trachoma.

Night Blindness

British	...	...	23
Indian	...	...	392

As will be observed, the majority of the cases occurred amongst Indians, a few were due to retinitis pigmentosa, but the bulk had no retinal lesion. Close on half of the cases had xerosis conjunctivae. On the other hand many cases with xerosis conjunctivae had no complaint of night blindness. There still remained many cases with no objective signs. Some of these were debilitated men, and no doubt their complaint of night blindness was genuine. Still there was a fair number of apparently healthy men who suffered from this complaint and in whom there was nothing to account for the condition. I know of no complaint in which it is so difficult to give a definite opinion in any case where there is no obvious lesion present. The fields of vision in such cases are said to be contracted, but in dealing with illiterates the taking of the fields of vision is almost impossible. One would naturally suspect cases as not genuine when an undue proportion occurred in one unit and not in other Indian units living under the same conditions. If one suspects a case is not genuine, one might ask the man's O.C. to put him on extra day duty. I have known of outbreaks of night blindness disappearing rapidly under such treatment.

The treatment adopted consisted in the adminstration of cod liver oil and the bandaging of both eyes during the day for about a fortnight. Some cases admitted great improvement after this treatment, while a few said they were no better. In men subject to this complaint the provision of glare glasses is advisable.

Iritis

British	...	...	49
Indian	...	...	136

This number occurred in 1918. Records for 1917 were not available. The causes of this complaint were various. Some were

due to syphilis and gonorrhoea, but the majority had no venereal history. A few followed malaria, enteric, or dysentry. As regards treatment, we found that a subconjunctival injection of cyanide of mercury, similar to that used in hypopyon ulcer, had in most cases an almost magical effect, the pupil dilating freely within 24 hours, and the patient declaring that all his pain and discomfort had disappeared. The testimony of the patient was, as a rule, most striking. The following two cases illustrate the value of this form of treatment.

(1) Corpl. G., admitted on January 12, 1918, with iritis of left eye, following enteric. The pupil was contracted and there were a few posterior synechiae present with marked ciliary injection. He had been under treatment with atropin for about three weeks. After the injection the pupil dilated freely and the patient declared that that night had been his first good night for several weeks.

(2) Turkish Prisoner A—, admitted with iritis of the left eye following malaria. Posterior synechiae and a whitish exudate in the pupillary region were present. The cornea also looked hazy. The day after the injection the exudate had disappeared, the pupil dilated and the cornea became clear. The patient declared that all pain had disappeared. In a few days all traces of inflammation had gone. Capt. Doyne, ophthalmic specialist, Baghdad, and I were so much impressed by the success of this treatment that we have now adopted it as a routine measure for acute iritis. In no other affection of the eye have we had such striking results as in iritis and iridocyclitis of the acute variety. The patients did not suffer much pain from the injection. In two cases a little slough formed in the conjunctiva of the lower fornix, but this cleared away gradually.

Gunshot Wounds.— In 1917 there were about 20 British and 40 Indian cases. In 1918 there were only two or three. This number does not represent all the eye injuries in the Force from gunshot wounds, as cases where the eye was hopelessly damaged were disposed of in the general surgical wards in the forward area.

Any high velocity bullet touching the eyeball usually destroys it completely. Where such bullets passed through or even near the orbit without touching the eyeball, very extensive damage to the inner coats usually occurred. The most common lesion thus produced was an extensive rupture of the choroid and retina. The most marked case of this injury that I have seen was one in which a piece of bullet had passed through one orbit and had lodged in the other orbit. At the posterior pole of each eye there was a large white glistening patch of about four papillae diameters. There were several small haemorrhages on and at the edges of these patches. The discs had disappeared. The retinal vessels came to an abrupt termination at the margins of the patches. There were

a few spots of pigment scattered over the patches and a disturbance of pigment at the margins extending into the unruptured retina. The patches presented the appearance of a coloboma of the choroid.

In the case of shell wounds the injury was either so severe as to destroy the eye completely or small fragments of the shell lodged in the eye. In none of the latter were we able to extract the fragments. As regards the treatment of such cases, I waited for a week or ten days. If the eye remained or became very irritable I excised it. If it quieted down in that period I left it alone. No case of sympathetic ophthalmia was reported in the Force. Only a few cases of gunshot wounds of the occipital lobes were recorded. And the symptoms were the usual ones associated with such lesions and about which so much has been recorded from the front in France.

Penetrating Injuries of the Globe.—A very large proportion of such cases were due to the bursting of soda water bottles. I found in pre-war days in Bombay that this accident accounted for the majority of penetrating wounds in that city.

Malingering as regards Vision.—This was not very common. Such cases are, as a rule, very easily detected, as the patient usually overacts the part. I found Snellen's coloured types most useful in dealing with such cases.

Cases of special interest.—(1) *Inflammation as the result of emetin getting into the eye accidentally.*

Sister F. came to me on January 1, 1918, complaining of great pain in the right eye, which had come on suddenly in the middle of the previous night. She said that about 11 a.m. on the previous day some emetin from a hypodermic syringe had got into her eye. There was slight swelling of the upper lid, injection of the bulbar conjunctiva and marked photophobia. The cornea showed fine staining on the application of fluorescein.

Remarks.—Since I have been in Mesopotamia I have seen six cases of this condition; all the patients were nursing sisters. It will be observed that the symptoms did not come on till about ten hours after the accident. The treatment employed was hot fomentations and. atropin. In about ten days the patients were fit for duty and the cornea had become quite normal.

Glaucoma occurring in comparatively young patients.

(1) Pte. A., W.I. Regt. (Negro), aged 27 years, complained of great reduction of vision in left eye, and commencing failure of vision in the right eye. Vision of R.E. was 6/12, of L.E, fingers at two feet. Tension was + 1 in both eyes. There was no ciliary congestion and very little pain. Fundal examination revealed deep cupping of left disc and slight cupping of right disc. Both eyes were trephined. After one month vision was R.E. = 6/6, L.E. = Fingers at six feet.

(2) Pte. G., R.A.M.C.. aged 29, complained of a dull left

supra-orbital pain. He volunteered the statement that he sees coloured rings round the lamp at night. Tension appeared to be slightly raised in the L.E. Vision with his correction—3 D sph.—2 D cyl., was R.E. = 6/9, L.E. = 6/12. The nasal portion of the left field of vision was markedly reduced. The nasal portion of right field showed only slight reduction. Both eyes were trephined and one month later the vision was the same as at time of admission and the pain and tension had gone.

Remarks.—The interesting point about these two cases was the age of the patients. The youngest patient I have ever seen with primary glaucoma was a girl of 10 years.

Quinine Amaurosis.—(1) U. S., Hindu coolie, aged 25, gave history that three days previously he had become more or less suddenly blind in both eyes while he had been in hospital under treatment for fever. I ascertained from the medical officer that he had only had 20 grains of quinine one day and 10 grains the day following. The state of his eyes on admission was as follows: pupils moderately dilated, no reaction to light, no perception of light apparently present. On fundal examination it was found that both discs were very pale and the vessels very attenuated, some of the arteries appearing like white threads. Patient was kept under observation for three weeks, but there was no apparent improvement in his condition. He was then invalided to India and I have heard nothing further about him.

(2) General S., aged 47. Was first seen by me on November 1, 1917. History was that patient was being treated for benign tertian fever. On October 23, 1917, at 4 p.m., he was given 10 grains of quinine bichloride and another 10 grains at 7 p.m, A few hours later he became very deaf and had buzzing in the ears. On November 24, 1917, he was very deaf. In spite of this he was given 5 grains of quinine at 9 a.m. and 12 noon on October 24, 1917. That same afternoon he became cyanosed and almost completely blind. Stimulants were then given, and the same evening he perspired freely, but the vision remained very dim. On October 25, 1917, vision improved, but still he could not read or distinguish objects across the room. After this he steadily improved. When I saw him his vision with his correction was 6/6. The fields of vision were almost normal, and there was no change in the fundi. He told me that, although he had been in India for twenty-five years, he had never taken quinine before.

Remarks.—In both the above patients comparatively small doses of quinine had been taken, but apparently both were very susceptible to the drug. As is well known, this is a very rare complaint, so that I was fortunate in having seen two cases in one year.

Case illustrating the effect of glare glasses on some individuals.—Colonel A., aged 52, complained that he had a tired and aching

feeling in his eyes. His refraction and fundi were normal. He wore the ordinary presbyopic reading glasses. I ascertained that he wore fairly dark glare glasses most of the day. On discontinuing their use, his symptoms at once disappeared.

Remarks.—My attention was first drawn to this point by the effects of glare glasses on my own eyes many years ago. After their use I got headaches, and my eyes were very sensitive to light. I gave them up over eighteen years ago and have never again used them. The case recorded is one of eight cases amongst officers who had a similar complaint and who got rid of all their symptoms on discarding their glare glasses. Myopes seemed to be immune from those bad effects, and on the contrary obtained relief from their use. The average man usually uses fairly dark glasses, and no doubt this leads to a greater strain on the accommodation. Several motor drivers in the R.A.S.C. have told me that they do not use their goggles as they gave them headaches. The rapid relief of symptoms was so remarkable in all the cases that I consider the trouble was due to the glare glasses and was not a mere coincidence.

In conclusion, I wish to express my thanks to Captains Doyne and Spencer, the ophthalmic specialists of Baghdad and Amara respectively, for much of the information contained in this report.

ADDITIONAL NOTE ON FREE INSTILLATION OF COCAIN WITH ADRENALIN, AND OF ESERIN IN CATARACT EXTRACTION

BY

H. HERBERT, Lt.-Col., I.M.S. (Retd.),

NOTTINGHAM

SINCE the writing of the inconclusive paper published in the April (1919) issue of this Journal, p. 152, the free use of cocain with adrenalin has been continued. And it has been generally followed by repeated instillation of eserin, after simple or "modified simple" extraction. The experience, as a whole, relates to 600 cataract extractions.

There is one definite practical observation to be recorded, apparently of some value. So far as I could judge, sensation in the iris disappears under cocain and adrenalin instillation, step by step with the reaction of the pupil to light. In testing the reaction a lens has been used to focus the light from the window on the pupil, the patient lying ready for operation, only the one eye being opened for the test. The progressive loss of pupillary activity

under the influence of these drops seems to afford a much closer indication of the state of sensibility of the iris than does the accompanying dilatation of the pupil. The size of the pupil when its motility disappears entirely, together with complete loss of sensation of pain in the iris, varies somewhat in cataract patients, possibly owing to varying minor grades of rigidity of pupil.

One could be confident that there would be no display of feeling in operating upon the iris only when the pupillary reflex had been quite abolished. We all know that many patients at quite a low stage of local anæsthesia seem to feel very little pain when their iris is pulled upon, or squeezed, or cut. We are not concerned with this. We are concerned with the sure and invariable elimination of all dangerous movements of lids and globe in operating among a sensitive and excitable people.

At one time we found some difficulty in ensuring full anaesthesia of the iris. This was apparently due to staleness and consequent ineffectiveness of our supply of adrenalin chloride solution. In one instance, after three adrenalin instillations among 4 per cent. cocain instillations repeated every three minutes for an hour, the pupil was still fairly small and active, and the operation had to be performed with the iris correspondingly sensitive. In our operations with maximal perchloride irrigation of the conjunctiva, the use of adrenalin is more imperative than in the practice of others.

Practical application was made of the above observation. It enabled us to divide up the patients into two groups for differential treatment according to our estimate of their self-control. In patients at all likely to prove "squeezers" full anaesthesia was considered advisable. This entailed combined extraction, since it was found that the wide fixed pupil of complete anaesthesia could not be fully contracted afterwards by eserin in time to guard against iris-prolapse.

In the somewhat smaller group of patients who seemed likely to bear a little pain without movement, and to keep their eyes quiet after operation, the simple method was attempted, though the attempt was not always successfully carried out. The operation was begun when the pupil was still in some degree active, though considerably dilated. With the pupil in this state we expected to produce full miosis afterwards with eserin, without symptoms of eserin poisoning appearing. Finally, however, a small prolapse occurred after a simple extraction performed with slightly active pupil. Eserin had been instilled seven times after operation, but the size of the pupil could not then be seen, owing to blood in the anterior chamber. A feeling of nausea was coming on. After this the pure simple method was given up. It was recognised that in order to be secure against prolapse in Indian hospital practice, either less cocain must be used, and the

(simple) operation performed with the pupil but little enlarged, or some form of excision or incision of iris must be always practised. The latter alternative was selected, frequent use being made of Elschnig's small basal iris-puncture.

One is in rather a dilemma when from any reason one has to operate upon a pronounced "squeezer" with the iris still obviously sensitive, i.e., with the pupil still fairly small and active. In such cases I have successfully substituted *radial division* of the iris for iridectomy. While the assistant holds the speculum forward off the eye, and draws the eyebrow well up on the frontal bone, after Smith, the iris is exposed by seizing the conjunctival flap with the fixation forceps and pulling it downwards. The iris is then cut with the points of de Wecker's scissors directed straight backwards. The necessary two or three small scissor-snips appear to be decidedly less painful than pulling the iris out of the wound, and excising a portion of it. And if the patient should attempt to squeeze, rolling up the eye, the conjunctival flap is readily released and the direction of the scissor blades is such that they cannot do much harm. They cannot well be caught in the corneal wound. The scissor points cut into the lens. On this account the procedure is not very well suited to Morgagnian cataracts. But in ordinary cases I feel inclined to try it extensively, to replace iridectomy, to obtain the narrowest possible of complete colobomata.

Upon eight occasions in which 1 per cent eserin was used, symptoms of poisoning supervened—stomach pain with vomiting, following upon nausea and faintness. In six other instances nausea and faintness alone were felt. In one feeble patient nausea was experienced after only four instillations of eserin, so that this drug could scarcely have been alone responsible. Another weakly patient vomited once or twice in the evening after combined extraction without eserin. Here free cocain instillation alone appeared to be the cause, and probably in other cases the cocain was partly responsible, directly or indirectly. Possibly the vaso-constrictive action of prolonged cocain and adrenalin instillation on the mucous membrane of the lacrymal passages may have considerably facilitated the flow, both of cocain and of eserin drops, into the nose. (The flow was not facilitated by voluntary lid-movements, as the lids were kept closed between the instillations.)

In a case of linear extraction (curette evacuation) in a young patient, I was much struck with the extremely wide dilatation of pupil seen next day, as a result of the use of atropin after operation, following upon free cocain and adrenalin instillation before operation. If in senile cataract extraction by the simple method anything nearly approaching this extreme dilatation were obtainable, the prevention of iris-prolapse would probably be more certain than by the use of eserin. Since returning to this country in April, 1919, I have been

endeavouring to obtain such dilatation. The difficulties are (1) the tendency to contraction of the pupil due to the low pressure in the eye from leakage through the large wound, and (2) more or less rigidity of the pupil in old people. Using adrenalin, then atropin, then cocain and again atropin, and then repeated cocain instillations a very wide dilatation can be obtained, powerful enough to persist but slightly changed after the cataract incision has been made. At present I am operating thus, sometimes by simple, sometimes by modified simple extraction. Atropin is again instilled twice after operation.

The method has not been very successful in preventing prolapse, but such prolapses as have occurred have been extraordinarily small.

All of these patients upon whom free cocain instillation has been practised with adrenalin, have their heads raised upon pillows or upon an inclined plane until the evening of the operation day, because of the suggestion of tendency to haemorrhage made in the paper already published.

OBSERVATIONS ON THE WEIGHT, VOLUME, AND ASH OF HUMAN LENSES

BY

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CALCUTTA.

IN Volume III of the *Transactions of the Ophthalmological Society of the United Kingdom*, a paper, by Mr. Priestley Smith, appeared "On the Growth of the Crystalline Lens," in which the weight and volume of lenses removed in their capsules post-mortem, and supposed to be clear, were recorded by means of an apparatus designed for the purpose. The author established the fact that the lens increases in weight and volume throughout life, averaging 1·5 mgm. increase in weight and 1·5 c.mm. increase in volume for each year of life from the age of 20 to 70. Apart from some valuable observations on the specific gravity of the lens, its diameter, the increasing weakness of the hyaloid membrane in older lenses, and the probable cause of hypermetropia acquisita, which are very interesting but do not concern us at present, Mr. Priestley Smith found cataractous opacities in 28 out of the 163 lenses examined. These were found more often, and to a greater degree, as the age of the patients advanced, as one would expect. Two of the cataracts were complete (ripe); of the rest, 22 were cortical, only four being nuclear. In India, the nuclear opacities would have outnumbered the cortical.

In 1908, Colonel Herbert, in his book on "Cataract Extraction," published the volumes of 15 cataractous lenses he had removed and measured in their capsules in Bombay. In the same year Mr. Priestley Smith very kindly had one of his instruments carefully tested and sent out to me by its maker, Bailey, of Birmingham, and with it I examined some cataracts expressed in their capsules, the results of which are recorded in the following table. As I have practically ceased performing expression of cataract in the capsule and so may have no further opportunity of adding to the observations, it may be as well to publish them now and compare them with those recorded by Priestley Smith and Herbert.

Each lens was expressed and weighed on a delicate chemical balance. Its volume was next measured by the Priestley Smith apparatus. Its diameter, lying on a table, was recorded, and it was then sent to Captain T. F. Owens, I.M.S., officiating Chemical Examiner to the Government of Bengal, who very kindly incinerated it, and furnished me with the weight of its ash. The temperature and barometric pressure were recorded also, and all the precautions in the measurement of its volume, as laid down, were carefully observed.

It was intended to weigh each patient as well, but unfortunately this was not possible. In three cases there is a note as to size and sex, but no influence of either is observable.

Few as the cases are, the results are of some interest, and in some respects confirm those previously recorded. The most marked feature of all the records is their wide variation. Perhaps in dealing with the examination of such small things as lenses it is to be expected, yet the variations reported by the different observers agree rather remarkably. Thus in *clear* lenses the extremes of weight recorded were from 151 to 283 mgm., and of volume from 139 to 262 c. mm. (P. Smith). The variations in *cataractous* lenses were as follows: *weight*: from 171 to 277 mgm. (P. Smith) 168 to 286 mgm. (Maynard); *volume*: from 157 to 263 c. mm. (P. Smith), 153 to 296 c. mm. (Herbert), and 162 to 305 c. mm. (Maynard); and *ash*: from 0·5 to 7·9 mgm. (Maynard). It is interesting to note that Mr. Priestley Smith recorded the greatest weight and the greatest volume in lenses from the same patient, and the lowest weight and the smallest volume in lenses from another individual.

Mr. Priestley Smith observed that lenses in which cataract was beginning were as a rule smaller and lighter than transparent lenses of the same age. This was so even in cases in which the opacities were only very slight. In two cases of ripe cataract he found the opaque lens much smaller and lighter than its less opaque fellow; in one the cornea was also slightly smaller in the eye with the more advanced cataract. The lightest cataractous lens, and the smallest in volume, in my series, was an unripe cataract, the only other

unripe cataract being also below the average both in weight and volume. The over-ripe lenses were still larger and heavier than the ripe ones. The average of each class was, in *weight*: unripe—187 ripe—223, over-ripe—235; in *volume*: unripe—179, ripe—231, over-ripe—283 c.mm. These figures point to a steady increase in weight and volume in Indian cataracts as they ripen and go on to hypermaturity. Eventually, no doubt, a Morgagnian cataract loses in weight and volume as its liquid portions become absorbed.

Age is so impossible to determine with certainty among hospital patients in the East that no observations can be grounded on the ages given. In one case only, No. 7, aged 21, was the age at all certain. In that case the weight and ash were above the average, and the volume was exactly the average. The ash showed great variations, and no definite relation to weight or volume is observable.

TABLE I.

Observations on eleven *Cataractous* Lenses removed in their Capsules

Serial No.	Temp.	Barometer.	Age.	Diameter of Cornea.	Diameter of Lens.	Weight of Lens.	Volume of Lens.	Ash of Lens.	Stage of Maturity.	Remarks.
				mm.	mm.	grm.	c.mm.	grm.		
1	85°	29·85	50	13	—	0·236	287·04	0·0006	over-ripe	—
2	89°	29.85	50	11	—	0·286	268·32	0·0006	do.	—
3	90°	29·60	50	12	8·5	0·201	234·01	0·0005	ripe	a big man
4	92°	29·60	51	11	9	0·200	190 32	0·0010	do.	a small woman
5	90°	29·68	50	11·5	9·5	0·206	196·56	0·00799	unripe	—
6	89°	29·77	45	12·2	9	0·168	162·24	0·0032	do.	—
7	89°	29·67	21	11	—	0·252	237·12	0·0038	ripe	—
8	90°	29·72	50	11·25	—	0·184	296·40	0·0011	over-ripe	a small woman
9	93°	29·68	67	11·50	9	0·235	262·08	0·0010	ripe	—
10	90°	29·57	55	—	10	0·270	305·76	0·0008	do.	—
11	86°·5	29·66	45	9·5	9·5	0·1815	168·48	0·0010	do.	—
Average		—	—	11·5	9·2	0·2199 =219 mgm.	237·12 =237 c.mm.	0·00195 =1·95 mgm.	—	—

In order to make comparison easier I have worked out, from the figures given in Mr. Priestley Smith's monograph, his results in

clear and cataractous lenses separately, and tabulated them with Colonel Herbert's and my own results.

TABLE II.

Comparative Table of Results

	Average Weight. mgm.	Average Volume. c.mm.	Average Ash. mgm.	Average Diameter Lens. mm.
CLEAR LENSES (Priestley Smith) ...	237	220.4	—	9.54
CATARACTOUS LENSES (Priestley Smith)	224	208	—	9.45
(Herbert)	—	225.6	—	—
(Maynard)...	219	237	1.95	9.21

The lesser average weight of our Indian lenses will be noted, also their markedly greater volume. Indian hospital patients in Bengal are as a rule of smaller physique and weight than European, few exceeding 100 lbs., and many of the women being as low as 70 or 80 lbs. How far this affects the weight of the lens cannot be stated without further investigation, but it does not appear to affect the volume.

The lens diameter is smaller in Indian cataracts, 9·21 mm. compared with 9·45 and 9·54 mm. in European lenses. This smaller diameter, in spite of greater volume, only shows perhaps how unreliable is the measurement of the diameter of a lens when removed from the body. Mr. Priestley Smith's lenses were measured while lying in water, mine lay on a hard flat surface. With the same lens the latter would probably give the greater diameter.

Fuchs gives the horizontal diameter of the base of the cornea as 12 mm. and quotes Merkel and Kallius' measurement as 11·9 mm., meaning the diameter of the anterior chamber. Obviously it is very difficult to measure the cornea in the living eye, as the encroachment of the sclera on it varies greatly. Still, my measurements average 11·2 mm. which is not much below 11·9, and from practical experience of European and Indian eyes, I doubt if the cornea of the latter is much smaller on the average. No relation is traceable between the size of the cornea and the weight or volume of the lens in my cases.

The combined figures indicate:

(1) That great variations in weight and volume are found in both European and Indian lenses;

(2) That in Indian cataracts the ash is very small and varies

considerably (Roemer states that the lens contains 35 per cent. of solids).

(3) That cataracts in Indians are on the average lower in weight and greater in volume than in Europeans in spite of the heavier physique of the latter.

(4) That cataract in the Indian shows a steady increase in weight and volume as it ripens and passes on into over-ripeness. How cataractous compare with clear lenses in Indians there are no figures to show. In Europeans, Mr. Priestley Smith's statistics prove cataractous to be lighter and of smaller bulk than clear lenses.

ANNOTATIONS

Ophthalmic Physicians

A paper was read recently before the Section of Ophthalmology of the Royal Society of Medicine* by Dr. Rayner Batten, in support of his proposal for the appointment of ophthalmic physicians on the staffs of hospitals, to co-operate with ophthalmic surgeons in the care of patients whose ailments are more medical than surgical. No one will dispute Dr. Batten's contention that a considerable proportion of the cases which come under ophthalmic surgeons, both in hospital and private practice, are in need of the advice of a physician rather than that of a surgeon; nor will he deny that while the average ophthalmic surgeon does not possess the requisite medical knowledge to deal with all such cases, the physician to whom he refers the patient not infrequently fails to fill the gap satisfactorily. Indeed, considered as a plea for greater efficiency in dealing with cases whose ocular lesions have a purely medical basis, Dr. Batten's paper will meet with general approval.

Although the writer disclaimed any such intention, there is a real danger that his proposals, if adopted, would lead to the development of two types of practitioners in one special branch of medicine, a contingency greatly to be deprecated. This obvious objection was prominent in the discussion at the Section of Ophthalmology, but it is notable that of the speakers who disagreed with the reader of the paper and his seconder, and who were alive to the inefficiency of existing methods, no one ventured on any constructive criticism, or made any alternative proposals.

That our present arrangements are not ideal, and do not ensure the best possible treatment of ophthalmic medical cases, is indisputable: it is probable, however, that Dr. Batten's paper and

* *Lancet*, November 29 and December 13, 1919.

arguments are based upon experience at ophthalmic hospitals. In a well-equipped general hospital, where a patient, referred by the ophthalmic surgeon, is admitted to a medical ward, and subjected to examination, often painfully thorough, by the physician and by the staff of the clinical, chemical, and bacteriological laboratories, there would be no scope for the energies of an ophthalmic physician.

Blindness due to Ophthalmia Neonatorum

The *News Letter*, the official organ of the National Committee for the Prevention of Blindness (New York) has recently (October, 1919) published the statistics of 1918-19 dealing with the admissions to the State Schools for the Blind, and with schools and day classes for the blind in various cities in the United States. The figures are interesting, since those for ophthalmia neonatorum are distinguished from the others. As regards 34 State Schools the total admissions for the two years was 3,537 children, of whom 89 (or 15·7 per cent.) had been blinded by ophthalmia neonatorum. The highest percentage of admissions from ophthalmia was in the Mississippi Institution for the Blind, where it reached the astonishing figure of 85·7 per cent., but then the significance of that figure is much diminished when we find that the total admissions were seven only, of which six were due to the disease in question. Eleven of the institutions had no ophthalmia admissions. Of 56 admissions into 10 schools and classes for the blind in the various cities 16 (or 28·6 per cent.) were admitted on account of the results of ophthalmia. From another table given by our contemporary, showing the number of pupils newly admitted in Schools for the Blind during the past eleven years who were blind from ophthalmia neonatorum, it appears that admissions from ophthalmia ranged from 26·6 per cent. of the admissions in 1907-8 to 14·7 per cent. in 1917-18. The percentage may, broadly speaking, be said to have fallen year by year, a most satisfactory result.

Colour-Matching by "Artificial Daylight"

The correct matching of colours is a problem of great interest, both from the physical and physiological sides, and has been appropriately the subject of study by the Illuminating Engineering Society on several occasions. Assuming that the operator engaged in matching colours has normal colour vision, he in general requires for his work a "white" light, approaching that of the difiused north sky. The ideal natural lighting conditions, however, are

not always realizable. Periods occur in winter when, owing to fogs or mist, the light is too feeble in intensity or too unusual in colour, to enable accurate colour-matching to take place.

It would, therefore, be a great advantage to have available some form of "artificial daylight," i.e., some means of producing, from artificial illuminants, a colour of light closely resembling normal daylight in colour. Such a source would enable colour-matching to be carried on independent of climatic conditions. It would be, for example, most serviceable in the dye industry, and in many processes in which colour-matching is important (e.g., the grading of hops, flour, tobacco, etc.). Similarly in picture galleries "artificial daylight" would be useful in enabling the colours to be seen under good conditions at night, while in drapers' shops, florists, etc., a less accurate imitation of daylight would probably suffice.

The earlier attempts at producing artificial daylight took the form of providing a special coloured screen used with arc lamps, whereby the excess of red and yellow in the artificial illuminant was filtered out. Similar methods were afterwards used with metal filament lamps. Dr. Kenneth Mees described before the Illuminating Engineering Society a special screen of gelatine coloured by permanent dyes, which converted the light from an ordinary metal filament lamp into a close approximation to daylight. This screen was stated to be not only visually, but photographically, correct; but naturally such exactitude involves a considerable loss of light. Blue glass bulbs for electric lamps have also been utilized.

The latest attempt, due originally to the artist, Mr. Sheringham, and recently described before the Illuminating Engineering Society by Mr. L. C. Martin, uses a different method. A large reflector is located above a gas-filled ("half watt") lamp, the lower portion of which is obscured. The surface of the reflector is coated with a mosaic of squares in different colours, such that the reflected light can be made to resemble either north sky light or diffused sunlight (which are not quite identical). The whole problem is a most interesting one, and the various methods deserve further study, both from the physical and physiological sides.

ABSTRACTS

I.—VITREOUS HAEMORRHAGES

(1) **Fuchs, Ernst (Vienna).—On the Pathological Anatomy of Vitreous Haemorrhages. (Zur pathologischen Anatomie der Glaskörperblutungen.)** *Arch. f. Ophthal.*, Vol. XCIX, Parts 2 and 3; Nachschrift, Part 4, 1919.

(1) **Fuchs** here records the anatomical changes which he observed on examination of a large number of vitreous haemorrhages of spontaneous or traumatic origin, dealing with these changes with regard to their situation, the appearances of the extravasated blood, and the processes of reaction and absorption.

1. *Situation.*—After referring to haemorrhage on the outer surface of the vitreous and its special features in the postlenticular and orbicular spaces, and between the vitreous and retina, he deals with haemorrhages into the vitreous itself. These may be (*a*) in rare cases confined to the outer limiting layer, the blood corpuscles being arranged in rows in conformity with the lamellated structure of this layer, or (*b*) spread immediately under it. In this case the haemorrhage usually comes from the ciliary region, and if it is of considerable amount may spread out in the form of a cup; here the blood corpuscles are often arranged in layers, although not with the same regularity as within the outer layer. The haemorrhage may (*c*) penetrate into the interior of the vitreous; the lamellar arrangement of the blood is then less frequent, as it tears through the framework of the vitreous, and spreads out irregularly, unless it finds its way into pre-existing spaces, such as the hyaloid canal, spaces arising from liquefaction of the vitreous or the entry of a foreign body. Where there are no such spaces the blood may be more or less sharply defined from the vitreous, or the erythrocytes form irregular strands in the adjacent tissue.

As regards the structure of the framework of the vitreous, Fuchs is of opinion that the regular arrangement of the erythrocytes in the marginal layers and interior of the vitreous (e.g., round the central canal) can only be explained by the presence of a series of membranes; according to his view the framework is composed of membranes which spread out from the vitreous base at the orra serrata in a fan-like arrangement forwards and backwards, with attachment to the limiting layer in front and behind, and between these towards the centre of the vitreous. Of the latter, those in front run inwards in a curve, with its convexity directed forwards, those behind are curved convexly backwards, while the lamellae

between these have a more or less straight course inwards. To this statement there is this reservation that the lamellae are less regular and often absent in the centre, especially in advanced life; while the central canal is enclosed by lamellae arranged concentrically around its sagittal axis.

2. *The changes in the haemorrhage.*—The author refers to its coagulation, and the appearances of the blood plasma, and the red blood corpuscles. The latter may be normal or exhibit changes in form (as the result of shrinkage, swelling, or haemolysis) and in their staining properties.

Haemolysis, i.e., the exit of haemoglobin and lipoid from the corpuscles, is the change most frequently observed in these cells, but the cause of it, whether it is due to a diminution in the osmotic pressure or the presence of haemolytic substances or the death of the cells from lack of oxygen, is not clear. This process takes place within a month after the haemorrhage appears in the vitreous, but it does not occur uniformly, the shadow cells being either distinct from, or mixed up with, normally staining corpuscles. The material leaves the erythrocytes in solution, and is then either precipitated between the shadows in the form of granules which show the same variation with eosin or Weigert as the corpuscles themselves, or spreads by diffusion throughout the vitreous and is carried away by the lymph. The author describes in detail the variation in the appearances, distribution, and staining of these granules, and emphasizes the relation between haemolysis and their formation.

3. *Reaction and Absorption.*—There is no reaction in the vitreous as a result of the presence of the haemorrhage, or its derivatives. Any reaction that takes place comes from the inner coats of the eye through substances which pass from the haemorrhage to the vitreous and reach these layers, setting up a chemotactic irritation which leads to mobilisation of the cells of the ciliary epithelium, migration of white blood cells, and the formation of new tissue.

The absorption of the blood is in part effected by phagocytosis—the distribution, number, and limited action of the phagocytes on the erythrocytes and granules is described—but in the case of large haemorrhages absorption is due more to haemolysis and the formation and removal of the granules above mentioned, or, where the haemorrhage is traversed by connective tissue, the gradual disappearance of the corpuscles enclosed in its meshes.

The formation of connective tissue begins from the ciliary body or retina, and is more likely to occur when besides the haemorrhage there is some inflammatory reaction. It was seen first fourteen days after the occurrence of the haemorrhage in the form of fibroblasts going in towards the blood, then in between the corpuscles to form long narrow threads or membranes. In other

cases the connective tissue is developed on the surface of the haemorrhage making a membrane round it. This formation of tissue may go on with or without phagocytosis.

THOS. SNOWBALL.

II.—THE TREATMENT OF RETINAL DETACHMENT

Verhoeff, F. H. (Boston, Mass.).—A new method of treatment for retinal detachment. *Ophthal. Record*, January, 1917.

Verhoeff, having found the numerous procedures, operative and otherwise, suggested for the treatment of retinal detachment, of little or no use, brings forward a new method which has proved successful in a case recorded by him. He describes his procedure as follows:—"The retina is first replaced by means of scleral puncture or other measures, and the patient is then kept in bed with both eyes bandaged for about a week. A large number of minute punctures through the sclera and retina are now made by electrolysis. At the site of each puncture the retina becomes intimately fused with the choroid. The procedure may be carried out under cocain anaesthesia and is not actually painful, although very unpleasant to the patient. I have employed a small steel half-curved eye needle, the current being obtained from a series of six dry batteries of 1½ volts each. The positive electrode in the form of a wet sponge is applied to the cheek. The conjunctiva is not dissected back, but the punctures are made directly through it. The slight conjunctival reaction resulting is of no importance. The needle point is pressed firmly against the globe until it penetrates the wall, when it is pulled back slightly so that the point protrudes only a millimetre or two into the vitreous and then allowed to remain about five seconds. . . I have selected the equatorial region for the sites of the punctures, but further experience may show that they should be made elsewhere. Their number probably should be varied according to the extent of the operation (in the case recorded, fifteen were made), but in any case it would seem advisable to make a few punctures also through the normal portion of the retina as a prophylactic measure. The patient is kept in bed for about ten days afterwards to allow time for the retina to become firmly adherent."

Perfect results can only be expected from the electrolytic punctures when the retina is previously completely in contact with the choroid, although possibly some benefit might accrue even in cases where the retina is still partly separated. For the preliminary replacement of the retina, Verhoeff finds simple scleral puncture

"with counter-pressure on the globe to force out the last trace of fluid possible," the most satisfactory.

The method may also prove of value as a prophylactic measure to be used on the uninvolved eye in cases of non-traumatic unilateral separation, particularly in cases of high myopia.

J. JAMESON EVANS.

III.—"SNOWBALL" OPACITIES OF THE VITREOUS

Holloway, T. B. (Philadelphia).—Asteroid hyalitis. *Trans. Amer. Ophthal. Soc.*, Vol. XV (1917), p. 153.

Holloway gives an account of those peculiar "snowball" opacities of the vitreous described by A. H. Benson (*Trans. Ophthal. Soc. U.K.*, Vol. XIV, 1894, p. 101) as "asteroid hyalitis" on account of their close resemblance to the stars on a clear night.

The opacities are globular or ellipsoidal in shape, of a dull white colour, not glittering, and some may show a slight projecting spur. They usually manifest but a limited range of movement and tend to return to their original position after excursions of the eyeball. They may be present in certain portions of the vitreous or pervade the whole of that structure. The reduction in vision is certainly less than might be expected.

Holloway gives details of four cases, two males and two females, aged 74, 73, 53, and 50 years respectively. The opacities were limited to one eye in three of the four patients. Sight in the eyes affected was 5/60, 5/4, 6/6, and 6/7.5. Complications included opacities of the lens, retino-choroidal disturbance, and retinal haemorrhage.

Analysing the thirteen cases of snowball opacity found in literature Holloway found that eight were males and five females, and that eleven were over fifty years of age. In a couple of instances both eyes were involved. The associated ocular conditions included lental opacities, signs of inflammation of the uveal tract, optic atrophy, glaucoma, and detachment of the retina.

There is a striking clinical resemblance between the cases described and those showing cholesterin crystals in the vitreous, and Holloway suggests "that the snow-white opacities are formed during the same or similar process that has to do with the deposition of cholesterin in the vitreous." He agrees with all other observers, however, that the snowball opacities are not composed of cholesterin.

S. S.

IV.—FUNCTIONS OF THE RODS AND CONES

Rochon-Duvigneaud, A. (Paris).—The functions of the rods and cones—indications furnished by comparative physiology. *Ann. d' Ocul.*, Vol. CLIV., Nov., 1917. (Eight figures in the text).

In this paper **Rochon-Duvigneaud** gives the results of his histological observations on the rods and cones of certain animals of the saurian tribe, in which some members of nocturnal habits are contrasted with others of diurnal habits. For example, in the Moroccan tortoise retina, thanks to the special properties of osmic acid, one can see that each cone is provided with a black spherule, which is absolutely confined to the cones and does not exist in the rods. If all the terminal elements show this black dot, then we are dealing with cones only, and rods are absent. This point is well brought out in the retina of the green frog where one can readily see the rods and cones quite distinct, not only by their length and shape but by the presence of the black spot which shows up all the cones. With this point in view Rochon-Duvigneaud proceeds to the study of a diurnal saurian, the chameleon, where the perceptible elements all possess the black dots, and there are no other elements but very fine cones at the centre getting larger and larger towards the periphery. The retina of the green or the grey lizard shows this even more clearly—the more conspicuous cones are easily seen with the black spot in each, all over the retina, and not a single rod. The diurnal saurians *i.e.*, the great majority of the saurians, have nothing but cones. There is, however, one family of nocturnal saurians, that of the geckos, and it has nothing but rods. The gecko's retina, prepared as the other and treated with osmic acid, shows the outer portion of the rods to be broken up into blackish lamellae piled like coins, entirely due to the reagents—an artefact. There is no black spot seen anywhere, merely rods, and these double and simple alternating. Thus a nocturnal member of this group has nothing but rods, whilst the more numerous diurnal ones possess only cones.

Comparison between the gecko and the chameleon eye shows that the former is specially adapted to night work while the latter is the acme of adaptation to daylight vision, smallness of cornea being extremely well marked. The human cornea occupies 60 degrees of the circumference of the eye, that of the chameleon 33 to 35 degrees, while its pupil is small, circular, and apparently devoid of all mobility, being affected neither by differences of light, nor mydriatics (atropin, strophanthin), destruction of the brain by needle, nor death. Its size suggests a miosis. The chameleon eye then is

specially suited for clear vision and this is supported by the presence of the highly developed fovea, extremely rich in cellular elements and provided with a central bunch of cones of an almost incomprehensible minuteness; in fact, the eye is a regular microscope. The eye of the gecko, on the other hand, shows all the points of adaptation to nocturnal vision—large cornea with an angle of 110 degrees, as in the various owls. The vertical slit-like pupil is very mobile and surpasses that of man, in fact, more resembles that of birds. In dull light it becomes widely oval or nearly circular, like the cat's, while in a bright light it shuts itself, the notched pupil edges engaging so as to exclude all light. Rochon-Duvigneaud suggests that the oval pupil of the animals that see in the dusk is better adapted for complete closure against bright lights than the round pupil. The gecko's posterior pole shows no attempt at a fovea whereas that of the chameleon is extremely highly finished, so that the gecko has presumably no central vision. Hidden away in crevices by day it pursues insects after dark with a marvellous agility, thanks to their movements, no doubt, rather than to their form.

As Ranvier observed, the gecko has visual purple, but its quantity, or at least the intensity of its colouration, is much less than in the frog, where it appears as blood-red in the retina of an animal coming out of the darkness. Rochon-Duvigneaud found with Ranvier that the gecko's retina after three days in darkness showed much less red than that of a frog under the same conditions.

Judging from the gecko, then, vision in a dim light depends on the rods, but do other animals of nocturnal habits show any support to this idea? The tortoise works at night and his retina has nothing but cones, but Rochon-Duvigneaud suggests that the tortoise may really use his olfactory sense to tell the plant or insects which are within reach of his neck. It is not suggested, however, that the cones are not used at all in dull light; it is purely relative.

It is not only the number but above all the length of the rods which increases (as Schultze had already noted in 1866) in the animals best adapted to nocturnal vision, *i.e.*, the external segments of the rods are increased in size. The more this mass is thickened or the thicker this mass is on a given surface, the better will it realize the transformation of luminous vibrations into nerve stimulus. That is in accord with the current theory on the functional value of the purple, which is more abundant, as the substance holding it has more volume.

This hypothesis agrees still with the smallness of the outer segments of the cones in the exclusively diurnal animals, such for example as the chameleon; in the lizards of our climate, whose cones are in general more bulky than those of the chameleon, the inner segment is very thick, the outer extremely small. It is so

also in the ring adder and the asp, viper, etc. The intense luminous vibrations would find in an external segment, little in bulk, a sufficient receptor, the feeble vibrations could not be utilized but by a grand mass of this same substance.

It is not then in the retinal structure that one must seek for dispositions susceptible of augmenting or diminishing the luminous sensibility, but solely in the mass of the vitreous substance constituting the outer segments. In other words the luminous vibrations will be taken up with much more efficacity as the external segments of the light-receiving elements are longer and form a very thick layer. This fits in with the phenomenon, well known in human vision, that the minimum light perceptible keeps the same right up to the limits of the visual field, although the retina simplifies itself enormously towards the periphery, while the external segments of the rods preserve their length right up to the ora serrata.

W. C. SOUTER.

BOOK NOTICES

Swanzy's Handbook of the Diseases of the Eye and their Treatment. By LOUIS WERNER. Twelfth Edition. Pages 671 with 273 text illustrations and nine coloured plates. Price, 22/6. London: H. K. Lewis & Co., Ltd. 1919.

Only four years have elapsed since the last edition of this well known text book, consequently no great alterations have been found necessary. It contains 27 additional pages and over a dozen new illustrations. A very brief account of Gordon Holmes's views on the cortical centre of vision is given in the chapter on neurology, but neither his name nor any indication of the matter is to be found in the index, although alluded to in the preface. From the student's point of view the book is tending to get rather large and costly, but can be confidently recommended as a reliable guide to the beginner in ophthalmology.

E. E. H.

Revue Générale d'Ophtalmologie. August-September, 1914.

We welcome the reincarnation of the *Revue Générale d'Ophtalmologie* after its suspension during the war. The number just received is dated August-September, 1914; it contains no original articles, and all its abstracts are from pre-war literature. The next two or three numbers will be brought out by the old editors, Professors Rollet, Truc, and L. Dor. On and after January, 1920,

the journal will become a Swiss publication, and will be edited by Professors Gourfein (Geneva), Eperon (Lausanne), and Vogt (Basle). Lieut.-Col. Elliot is the English correspondent. S. S.

La Médecine. October, 1919.

The first number has been received of *La Médecine*, published in Paris, and conducted upon a somewhat novel plan, since each monthly number will be devoted to one of the branches of medical or surgical science. Thus the present issue is given up to general surgery. Among the editors there are exponents of surgery, medicine, ophthalmology, etc. Cantonnet is the ophthalmologist. The address of the journal is 21, Blvrd. Saint Germain, Paris, and the annual subscription to those living outside France is eighteen francs.

S. S.

Cuban Review of Ophthalmology, Vol. I, Part iv, 1919. **(Revista Cubana de Oftalmologia),** Habana, Cubá.

The biographical section of this number contains notices of E. Landolt; of Enrique B. Demaria; of Carlos E. Finlay of Habana; of L. Weekers; of Gonzales of Mexico; of Oufray of Paris; of J. J. Rubio of Guayaquil; M. M. Amat of Almeira; E. and J. Wieden of Valencia; J. M. Espino of Venezuela, and of O. C. Netto of Brazil. Photographs of each are published with, in most cases, a valuable bibliography of their published works.

The editor contributes two interesting annotations on the teaching of ophthalmology and on the regulation of opticians; the first contrasts the steps which have been taken in North America and in Great Britain to improve the teaching, and we gather that similar steps are needed in Spanish America. The second shows that the South American optician is very like his *confrère* in this country and that his activities need curbing.

Among the numerous papers by J. S. Fernandez we note an important one on the advisability of undertaking a systematic examination of the eyes of school children before they are allowed to enter school, with a view to prophylaxis. It will be within the recollection of all our readers that this subject formed part of a discussion on eyesight and education which was held at the annual Congress of the Ophthalmological Society of the United Kingdom in May last. We do not gather from Fernandez's paper at what age the South American child enters school, but at whatever age this be, there can be no doubt that it would be a very good thing both for the child and for the State that children should be examined and records made by an ophthalmic surgeon before they enter school. Fernandez points out that many children in Cuba

suffer from trachoma in rather a quiet form, and that in his experience the strain of school life causes an exacerbation of the disease when the discharge is highly contagious and may easily cause an epidemic of the disease in children who were formerly free from the disease. Then, again, the importance of high hypermetropia as a cause of squint cannot be overlooked. Myopia is fortunately rare in Cuba, and in connexion with this he points out that the light there is, of course, very good. The results of ophthalmia neonatorum and of interstital keratitis are dwelt upon, as well as the value of spectacles as a cure for eyestrain and headache. Ruiz of Seville describes a single stitch operation for the advancement of a rectus muscle, which is ingenious and not very complicated. A paper by E. Wieden on Nicola's new treatment of trachoma calls attention to a subject of perennial interest, and we believe that very little is known in this country about this form of treatment which has arisen in Italy.

The remaining papers are mostly short ones, clinical records of cases, and there is one by Espino on the history of ophthalmology in Venezuela.

The reviews of articles and of books follow the usual lines, as do those of the various societies. The obituary section contains notices of Sir James Mackenzie Davidson, of John Couper, of Mortimer Frank, and of Newton C. Steele, and of others.

It will be seen that the editor of the journal has spread his net widely; it is no easy task to furnish excerpts of the world's ophthalmic literature and we congratulate him on the completion of his first volume.

R. R. JAMES.

CORRESPONDENCE

ON A RARE FORM OF SUBCONJUNCTIVAL GRANULOMA IN CENTRAL CHINA

To the Editor of the BRITISH JOURNAL OF OPHTHALMOLOGY.

SIR,—After reading Dr. McAll's paper in the last number of this Journal, I was struck with the possible resemblance to other forms of elephantiasis that I had seen in Shanghai. I was fortunately able to discuss the matter with Sir Patrick Manson, the pioneer in this branch of research. He considers that the cause is

almost certainly parasitic, either protozoal or helminthic. A careful blood examination would confirm this if definite eosinophilia was found. He did not think it would be found to be any of the known varieties of filaria, as I had thought might be the case.

I hope Dr. McAll may give us some further account of his investigations of this hitherto unknown disease.

I am, Sir, yours truly,

E. ERSKINE HENDERSON.

LONDON, W.

OBITUARY

Medicine deplores the loss of one of her greatest sons—Sir William Osler, Regius Professor of Medicine in the University of Oxford—which took place after a short illness on December 29, 1919, at Norham Gardens, Oxford, in his seventy-first year. The sixth son of the Rev. F. L. Osler, Sir William was born at Bondhead, Ontario, whither his father had gone as a missionary. He received his preliminary education in Toronto, and pursued his medical studies at University College, London, and at Berlin, Vienna, and Leipsic, where the most advanced medical teaching was then to be found. At the early age of 25 he was appointed professor of the Institutes of Medicine at McGill University. For five years he held the professorship of clinical medicine at the University of Pennsylvania, and was then called to be professor of medicine in the Johns Hopkins University at Baltimore, where his work and example effected a remarkable improvement in the standing of the medical school. In 1905 he was appointed Regius Professor of Medicine at Oxford in succession to Sir John Burdon-Sanderson. No choice could have been happier in the interests of the Oxford Medical School. His sympathies with the young man desirous of learning were widely recognized, and will be remembered with gratitude by those who had the privilege of working under him. Sir William was distinguished in many walks of life. He was a man of letters, a ripe classical scholar, a voluminous writer, and a great physician. He was created a baronet in 1911. His connection with ophthalmology was long and intimate. He was an original member of the Oxford Ophthalmological Congress, and he was a well known and sympathetic figure at its meetings. He was a councillor of the Congress, and the large number of Americans who attended the meetings of that body gave him many opportunities of renewing

old friendships and of cementing new ones. He and Lady Osler were always ready to entertain members in the beautiful garden of his Oxford residence. His body was cremated at Golder's Green on January 2, 1920, the funeral service having been held at Christ Church Cathedral, Oxford.

We regret to announce the death of Dr. R. Craggs at Newcastle-upon-Tyne, at the age of 50 years. Although chiefly engaged in general practice, he was for many years ophthalmic surgeon to the Hospital for Sick Children.

NOTES

Honours

A KNIGHTHOOD has been conferred upon Josiah Court, whose name is familiar in connection with miners' nystagmus.

Upon Professor Nuel, of Liège, and Professor van Duyse, of Ghent, in recognition of their devotion during the German occupation of Belgium, honours have been bestowed; upon the former, that of Commander of the Order of Léopold, and upon the latter, that of officer of the same order.

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Archives d'Ophtalmologie

THE *Archives d'Ophtalmologie*, founded twenty-seven years ago by Ph. Panas, E. Landolt, and F. Poncet, announces that for the future it will be edited by Truc (Montpellier), Rollet (Lyons), Frenkel (Toulouse), and Duverger (Strasbourg). The journal will revert to its pre-war custom of publishing twelve numbers in the year.

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Failure to provide Spectacles

WE are glad to see that the parent of a school child in Bootle has been fined 40s. and costs for neglecting to provide spectacles necessary for his myopic child. The prosecution was undertaken by the National Society for the Prevention of Cruelty to Children.

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Moorfields Dinner

THE Moorfields Annual Dinner for past and present students, which has been in abeyance during the war, will be resumed this year. It will take place on Thursday, March 11, and further particulars will be published in due course.

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Ophthalmological Society of the United Kingdom

THE next annual congress of the Society will be held on April 29 and 30 and May 1, 1920. On the morning of Thursday, April 29, the President, Mr. J. B. Story, will deliver his opening address at the Royal Society of Medicine, and in the afternoon, cases, etc., will be shown at the Royal London Ophthalmic Hospital. Members will dine together in the evening. A discussion upon "Diabetes in Relation to Diseases of the Eye," to be opened by Sir Archibald Garrod, Mr. R. Foster Moore, and Dr. E. Spriggs, will be held on the morning of Friday at the Royal Society of Medicine, and communications will be read in the evening. Saturday morning will be devoted to visiting St. Margaret's Hospital, Leighton Road, N.W., the special hospital of the Metropolitan Asylums Board for cases of ophthalmia neonatorum, and a discussion will take place upon "The Prevention and Treatment of Ophthalmia Neonatorum," which will be opened by Dr. Gibbon Fitzgibbon and Mr. M. S. Mayou.

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The Ophthalmological Society of New South Wales

AT the annual meeting of this Society, Dr. R. H. Jones (the retiring president) proposed a resolution to the effect that a letter be drafted by the Council and signed by all members, and be forwarded to the publisher of the "Telephone Directory," asking him to omit the list of ophthalmic surgeons from future issues of that publication. The resolution was carried.